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Fourth Semi-Annual Report to the Great Lakes Water Quality Board from the Upper Lakes Reference Group, September 1974

International Reference Group on Upper Lakes Pollution

FOURTH SEMI-ANNUAL REPORT

TO

THE GREAT LAKES WATER QUALITY BOARD

FROM

THE UPPER LAKES REFERENCE GROUP

September 1974

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The Upper Lakes Reference Group and its four Work Groups, its Coordinating Committee, and its Committee for Data Quality, continue their activities to fulfill the objectives of the Detailed Study Plan. This report is intended to update the Water Quality Board on progress of studies since the Third Semi-Annual Report. Meetings, membership, and significant activities by the Reference Group and by each of the subordinate groups are detailed.

UPPER LAKES REFERENCE GROUP

MEETINGS

April 9-10, 11th Meeting, Chicago

June 12-13, 12th Meeting, Thunder Bay

August 6-7, 13th Meeting, Detroit

MEMBERSHIP

Mr. Wayne A. Willford of the U.S. Fish and Wildlife Service, Ann Arbor, has replaced Mr. Oral H. Hert, State of Indiana, in the United States Section. Mr. John D. Kinkead of the Ontario Ministry of the Environment, Toronto, has replaced Mr. John Neil.

ACTIVITIES

Detailed Study Plan

The Detailed Study Plan for 1974/1975 was presented to and approved by the IJC at its meeting on April 4, 1974. The IJC commended the Reference Group for the quality of its submission.

Funding

The U.S. EPA has obtained FY 1974 supplemental funds totaling $986,000 for a number of Upper Lakes projects. Canadian programs are being conducted within the fiscal-year funds as previously requested. Submissions have been prepared for revised 1975/1976 funding.

Public Meeting

The Reference Group arranged a meeting with interested parties in the Thunder Bay area, at the time of the 12th Meeting, to apprise them of Reference Group activities.

The meeting was attended by a small number of well-informed and concerned individuals. The Chairmen were interviewed by the local news media. The meeting provided a significant contribution to the IJC's ongoing assessment of its public relations policy.

Cruises

Summer season main lakes survey operations involving CCIW vessels are currently underway on Lake Huron and Georgian Bay. The U.S. EPA oceanographic vessel acquired from the Coast Guard, in 1973, and renamed the

R.R. Simons in June, 1974, has been supporting Lake Huron water quality studies since April, 1974. These studies are being conducted by the University of Michigan under contract from the U.S. EPA Grosse Ile laboratory.

Reserve Mining Company Data

EPA-Region V will review and evaluate all available data on the Reserve Mining Company taconite plant discharges at Silver Bay, Minnesota utilizing in-house personnel. An assessment of total pollutant loadings to Lake Superior and the resultant water quality effects will be made. Pollutant parameters included in mass balance calculations plus toxic pollutants will be emphasized.

Sediment and Erosion

Sample collection and analysis of loadings data, composition data, and the water quality effects of sediment inputs to the Upper Lakes are being conducted by both the ULRG and LUARG but may be incomplete for the ULRG Final Report. The Reference Group is in the process of requesting information input from the LUARG. A letter to this effect was signed by the ULRG Co-Chairmen on September 4, 1974. This letter will provide a basis for discussion among the Chairmen of the two Reference Groups during the Ottawa IJC meeting in October, 1974.

Fisheries

Different sample preparation procedures are being utilized to determine levels of toxic pollutant concentrations in fish collected during the fisheries studies. Nearshore studies are approached from a public health concern; hence, fillets are prepared for analysis. Open water studies are designed to determine baseline levels of toxic pollutants in fish; hence, the whole fish is prepared. Intercomparisons among the participating agencies to ascertain the existence and the extent of differences in analytical results are being initiated.

Great Lakes Fisheries Commission

The Reference Group is developing areas of interaction with the Great Lakes Fisheries Commission, through the attendance of ULRG fisheries members at GLFC meetings.

Quarterly Reports

A simple, easy to understand and use, format for Quarterly Progress

Reports has been adopted. It is planned to develop a "flow chart" showing the relationship between completion of Study Plan projects and preparation of the ULRG Final Report.

Report Distribution and Review Policy

The Reference Group has adopted a policy whereby all manuscripts containing information for the Final Report will be submitted to the Regional Office, Windsor, for information purposes and for ready access by Reference Group and Work Group members during Final Report preparation. Those reports which are intended for publication will be reviewed by Reference Group members for policy implications and flagging of items for IJC attention, if appropriate.

Final Report

The structure and the content of the Final Report continues to be defined. A copy of the outline is appended (Attachment No.1). Individual projects have been related to the subchapters of Volumes II and III. Tentative assignments for authorship of each subchapter of Volumes II and III have been made by the Reference Group and concurrence in these assignments is being requested of the appropriate agencies. The project relationship and the probable authors are provided on the outline. Editorial responsibility has been conferred upon the Regional Office Secretariat, with the assistance of a supporting editorial committee.

Validity of Analytical Data

The Reference Group adopted Recommendations prepared by the Committee for Data Quality and has asked the participating laboratories for comments and a description of actions to be taken toward implementing them. A copy of the Recommendations is appended (Attachment No. 2). The Recommendations were developed in order to ascertain the validity of the analytical data which will provide the basis for the Final Report. They address general sample collection and analysis methodology and equipment; definitions and nomenclature; accuracy and precision; specific data produced for nitrogen, phosphorus, chloride, sulphate, and silicate; the reporting of data; and evaluation of both past and present data.

The Reference Group has recommended to the Water Quality Board that a Quality Control and Data Assurance Committee be established to address these concerns as they manifest themselves within programs under the Water Quality Agreement.

DIRECTION AND GUIDANCE REQUESTS

Surveillance and Monitoring Programs

The Reference Group has asked the Water Quality Board the degree to which it should elaborate upon the structure of surveillance and monitoring programs in its Final Report recommendations.

Introduction of Fish Species

The Reference Group has asked the Water Quality Board to comment upon the Reference Group's intention to acknowledge and describe but not pursue in depth, the complex interrelationship between fish harvesting, pollution and the introduction of pest species in the total fisheries ecology situation in the Upper Lakes.

Water Quality Criteria, Mixing Zones, Localized Areas

The Reference Group has asked the Water Quality Board to advise it concerning the employment of specific definitions for mixing zone and localised areas concepts for use by the Reference Group in (a) determining where pollution abatement is necessary and (b) defining non-degradation criteria. The Reference Group is preparing, for future comment by the WQB, its recommended specifications for pollution criteria and for non-degradation definition criteria.

COORDINATING COMMITTEE

TASK

Analyze Reference Group Study Plan progress and problems, develop recommendations for action by the Reference Group.

MEETINGS

April 3. 4th Meeting, Toronto

June 27. 5th Meeting, Bay City

September 17. 6th Meeting, Toronto

MEMBERSHIP

Mr. A.G. Kizlauskas, EPA, Region V, Chicago, has replaced Mr. D. A. Payne.

ACTIVITIES

The Coordinating Committee (formerly the Executive Committee) continues to function well to identify and more fully define concerns for and subsequent action by the Reference Group, and to provide a necessary link to expedite interactions among the Work Groups. The Coordinating Committee has been involved with many of the activities reported for the Reference Group and the Work Groups. It also has undertaken to interface directly with Task Groups of the Reference Group on Great Lakes Pollution from Land Use Activities.

WORK GROUP A

TASK

Develop background information and socio-economic studies

MEETINGS

May 10. Work Session for Study Item IV, Windsor

June 7. Roseville

August 2. Work Session for Study Item IV, Burlington

MEMBERSHIP

Mr. Paul E. Davis of the Minnesota Pollution Control Agency, Roseville, has replaced Mr. M.R. DesParte. Mr. R.C. Ostry of the Ontario Ministry of the Environment, Toronto, has replaced Mr. R. Hore. Mr. J.P. Dooley of the Michigan Department of Natural Resources, Lansing, has replaced Mr. W.D. Johnson, EPA, Chicago.

ACTIVITIES

Work Group A activities are progressing satisfactorily. Significant accomplishments are detailed below.

Historical Data

Draft reports for several background projects for Study Item I have been completed. A list is appended (Attachment No. 3). Liaison with the Great Lakes Basin Commission has been established and their Framework Study Reports are being utilized.

Socio-Economic Forecasting

Work Group A has initiated work on Study Item IV, trends in and relationships between geographic and water resource characteristics. Most of the basic population and economic data required are available. A prototype model for predicting the future conditions of the Upper Lakes, considering alternative assumptions, has been developed. A refined model should be available by January 1, 1975. A strategy has been developed to provide the required economic input data for the calculation of future waste loadings into the Upper Lakes.

WORK GROUP B

TASK

Main lakes studies

MEETINGS

June 26. Work Session for Project B-27, Windsor

August 1. 3rd Meeting, Burlington

September 25. 4th Meeting, Ann Arbor

MEMBERSHIP

Mr. Wayne A. Willford of the U.S. Fish and Wildlife Service, Ann Arbor, has been added. Mr. A. G. Kizlauskas, EPA, Region V, Chicago, has replaced Mr. D.A. Payne as U.S. Chairman.

ACTIVITIES

Work Group B activities are progressing satisfactorily. Significant accomplishments are detailed below.

New Projects

Work Group B has developed and implemented study plans for two new projects:

B-27: Lake Huron/Saginaw Bay Water Movement Study

B-28: Toxic Organic Survey of Lake Huron/Georgian Bay and Lake Superior

The detailed arrangements for the joint implementation of B-27 by EPA, NOAA, and CCIW during the winter of 1974/1975 are being completed. B-28 is being conducted by CCIW;a copy of the project summary is appended (Attachment No. 4).

Chicago Diversion

The effect of a proposed increased water diversion at Chicago on the volume outflow and the transport of pollutants from Lake Michigan will be considered in conjunction with WG-A's forecasting activities.

WORK GROUP C

TASK

Sources and characteristics of materials inputs

MEETING

September 11. Toronto

MEMBERSHIP

Mr. Lanny Peissig of the Minnesota Pollution Control Agency, Roseville, has replaced Mr. M.R. DesParte.

ACTIVITIES

Work Group C activities are progressing satisfactorily. Significant accomplishments are detailed below.

Point Source Inputs

Work Group C has completed an extensive preliminary assembly of inputs from point sources (municipal, industrial and tributary) into the Upper Lakes and have calculated preliminary loadings values. Deficiencies were identified and the required data are being obtained. The location of sampling stations, the frequency of sample collection, and the parameters analyzed for, have been modified as necessary to accommodate subsequently identified needs to ensure availability of the data required.

Atmospheric Loading

The model to determine atmospheric dispersion of pollutants and their transfer from air to water has been developed by the contractor, Acres Consulting Services Ltd. of Niagara Falls, Ontario. The basic assumptions of the model are being reviewed and verified as the model undergoes refinement. Preliminary calculations indicate that atmospheric loadings for nitrogen and phosphorus into the Upper Lakes are significant with respect to land point source inputs.

A contract will be awarded shortly, by U.S. EPA, Region V, to develop a complementary model to describe dry atmospheric loading.

WORK GROUP D

TASK

Local effects studies

MEETINGS

March 26. 3rd Meeting, Toronto

August 20. U.S. Section, Detroit

MEMBERSHIP

Mr. Murray German of the Ontario Ministry of the Environment, Toronto, and Dr. Tudor Davies, EPA, Grosse Ile, are no longer members.

ACTIVITIES

All scheduled Canadian survey activities in Lake Superior have been completed with the exception of the intensive studies being carried out in Nipigon Bay, the continuation of phytoplankton monitoring at the Thunder Bay water intake, the mapping of cladophora accumulations and the completion of the nearshore fish collections. Project reports are nearing completion for studies carried out on Lake Superior nearshore waters, Jackfish Bay, Peninsula Harbour, Pine Bay, Thunder Bay and the St. Marys River.

In Lake Huron Canadian local effects studies are progressing satisfactorily with some setbacks being suffered in the Ontario nearshore monitoring program because of mechanical problems with the major survey vessel. Collection of fish from the nearshore waters of Lake Huron and Georgian Bay and from the St. Marys River will commence as planned in the fall of 1974.

Wisconsin has completed its nearshore field studies and Minnesota should complete theirs by mid-October; Michigan has completed about half of their field collections and the Saginaw Bay study is on schedule.

New Project

Work Group D has developed and implemented plans for a new project:

D-35: Lake Huron Discharge

Activities will be handled by MOE and EPA. A copy is appended (Attachment No. 5).

Funding

Funding awards have been made for the nearshore U.S. fisheries studies (Projects D-15 and 34). The award for Project D-33 has been delayed but is expected shortly.

COMMITTEE FOR DATA QUALITY

TASK

Validity of analytical data

MEETINGS

May 8. 2nd Meeting, Windsor

June 26. 3rd Meeting, Windsor

July 30. 4th Meeting, Minneapolis

September 26-27. 5th Meeting, Toronto

MEMBERSHIP

The membership remains unchanged.

ACTIVITIES

Recommendations

The Committee for Data Quality developed Recommendations regarding sample collection and analysis; these are described under the Reference Group activities, above, and in Attachment No. 2. The basis for the Recommendations was provided by an exhaustive poll of Upper Lakes laboratories to document present methodologies and capabilities.

Ongoing interlaboratory comparision studies initiated by both the Committee and by the jurisdictions have assisted in improving the overall accuracy and precision of the data produced.

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Final Report of the International Upper Lakes Reference Group

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- Chapter 2. Description of Study Area, including trends

  - Physical features
  - Population
  - Land uses
  - Water uses
  - Fishery Resources

- Chapter 3. Summary of sources, character and disposition of waste inputs, including trends and predicted effects of trends.

  - Municipalities
  - Industries
  - Tributaries, including Lake Michigan
  - Land Drainage
  - Atmosphere and other sources
  - Materials balance
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- Chapter 4. Water Quality Objectives

  - Non-degradation criteria
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- Chapter 5. Summary of existing water quality conditions and apparent trends.

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    - accumulating solids
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  - Coastal and embayment regions
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    - accumulating solids
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  - Institutional arrangements
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VOLUME II - LAKE HURON AND GEORGIAN BAY

OUTLINE	RELATED PROJECTS	LEAD WORK GROUP, PERSON AND/OR AGENCY
INTRODUCTION (Purpose of ULRG Studies)		RG Chairmen
Summary and Conclusions (to include arguments and rationale to support the conclusions reached)		ULRG Members
Reference Question No. 1 Reference Question No. 2 Reference Question No. 3 Reference Question No. 4		
CHAPTER 1. Description of Study Area and Human Component Characteristics, Including Historical and Future Trends		WG-A; Pinkstaff; Batteké
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1.4 Land Uses	A1-2.2.3	WG-A; J.McGuire; D.Robinson
1.5 Water Uses	A1-2.1.3.3;2.2.2.2;2.2.4;3.2.4;A4-2.5; A4-3.6	WG-A; D.Kraus, D.Robinson
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2.4 Localized Areas		D.Robinson; I.Szekelyhidi
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OUTLINE	RELATED PROJECTS	LEAD WORK GROUP, PERSON AND/OR AGENCY
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3.3 Interlake Transport (including Lake Michigan, reference to lake levels regulation)	B-3;B-6;D-1	Y.Hamby; A.P.Pinsak; F.Elder; J.D.Kinkead
3.4 Atmospheric Input Sources	A1-3.1.2; WGC (Atmospheric Subgroup)	D.Swanson; F.Elder
3.5 Shore Erosion/Sediment Input	A1-2.1.2;3.1.2;3.1.3.1	R.L.Thomas; W.E.McCracken
3.6 Thermal and Radioactive Inputs	D-28	A.Johnson; J.Truchan
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4.2 Pentang Midland	D-4	D.Veal; P.Dillon
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OUTLINE	RELATED PROJECTS	LEAD WORK GROUP, PERSON AND/OR AGENCY
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5.5 Microbiology	B-13;14	S.S.Rao
5.6 Fish	A1-2.1.3.3;3.2.2.2;A4-6.1 to 6.3;B-1;25	J.F.Carr (Lead); F.A.J.Armstrong;
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OUTLINE	RELATED PROJECTS	LEAD WORK GROUP, PERSON AND/OR AGENCY
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VOLUME III - LAKE SUPERIOR

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1.2 Population	A1-2.2.1;A4-2.1 to 2.5	WG-A; Pinkstaff; D.Robinson
1.3 Economic Structure	A1-2.2.2.1;2.2.2.2;2.2.3;2.2.4;A4-3.1.1 to 3.6	WG-A; Szekelyhidi; D.Robinson
1.4 Land Uses	A1-2.2.3	WG-A; J.McGuire; D.Robinson
1.5 Water Uses	A1-2.1.3.3;2.2.2.2;2.2.4;3.2.4;A4-2.5; A4-3.6	WG-A; D.Kraus, D.Robinson
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2.3 Mixing Zones		D.Robinson; I.Szekelyhidi
2.4 Localized Areas		D.Robinson; I.Szekelyhidi
2.5 Existing Abatement Programs	A1-2.2.5;3.2.8	D.Robinson; I.Szekelyhidi

OUTLINE	RELATED PROJECTS	LEAD WORK GROUP, PERSON AND/OR AGENCY
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3.4 Atmospheric Input Sources	A1-3.1.2; WGC (Atmospheric Subgroup)	D.Swanson; F.Elder
3.5 Shore Erosion/Sediment Input	A1-2.1.2;3.1.2;3.1.3.1	R.L.Thomas; W.E.McCracken
3.6 Thermal and Radioactive Inputs	D-28	A.Johnson; J.Truchan
3.7 Dredging Activities		WG-D; Wilkins; W.E.McCracken
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3.10 Materials Balance and Calculations	D-1;35	WG-C; Van Fleet; McCracken
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5.3 Chemical Limnology	A1-2.1.3.1;B-1;2;15;16;17;18;21;23;26	D.A.Payne; D.Warry
5.4 Aquatic Biology (Plankton and Benthos)	A1-2.1.3.2;B-2;7;8;10;21	N.Watson; M.Anderson
5.5 Microbiology	B-13;14	S.S.Rao
5.6 Fish	A1-2.1.3.3;3.2.2.2;A4-6.1 to 6.3;B1;25	A.H.Lawrie (lead); F.A.J.Armstrong
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CHAPTER 6. Existing and Developing Problems (Effects of Human Activities and Materials Inputs, relationship between water quality conditions and loadings, discussion of transboundary movements, fish contamination)		CC
6.1 Enrichment	D-1;2;4;5;6;8;10;12;13;14;16;24;25;27;32; B-2;7;8;10;16;17;18;21;A1-3.2.7	WG-B; K.Patalas, C. Schelske
6.2 Bacterial Contamination (Health Related Heterotrophs)	D-1;4;6;7;8;9;10;11;12;14;16;19;21;24;27;29;32; B-2;A1-3.2.2.2	WG-D; S.S.Rao; M.Young
6.3 Metals Contamination (Breakdown by Individual Metals)	D-1;2;6;7;8;9;10;11;12;13;14;16;19;20;21;22;24;27; 28;32;B-2;20;25;A1-3.2.2.2	WG-D; J. Hesse (Lead); Y.K.Chau; R.Boelens; F.A.J.Armstrong
6.4 Organic Contaminants (Pesticides, PCB's, et al.)	D-1;2;4;7;9;10;12;15;16;20;21;22;24;27;29;32; B-2;25;A1-3.2.2.	WG-D; G.Glass (lead); W. Strachan; R.Chatterjee;F.A.J.Armstrong
6.5 Dissolved Solids	D-1;4;6;7;8;9;10;12;16;21;24;27;28;29; B-4;20;21;A1-3.2.4	WG-B; D.Warry; D.A.Payne

OUTLINE	RELATED PROJECTS	LEAD WORK GROUP, PERSON AND/OR AGENCY
6.6 Suspended Solids	D-7;10;12;21;B-21;23;A1-3.2.4	WG-B; J.Helvig; C.Kleveno; R.L.Thomas
6.7 Spills and Other Disasters	A1-3.2.7	WG-A; P.Belling
6.8 Lake Levels Regulations	A1-3.1.1	WG-A; P.Yee, J.Chandler
6.9 Dredging	D-10	WG-D; D.Kraus; P.Sly; D.Wilkins
6.10 Vessel Wastes		WG-D: G.V.Buxton
6.11 Thermal Inputs		WG-D: G.K.Rodgers; A.Johnson
6.12 Radioactivity		WG-D; R.Durham; A.Johnson
6.13 Pollution Effects by Water Use (Summary Discussion)		WG-A
CHAPTER 7. Adequacy of Existing Water Quality Criteria and Abatement Programs. To be addressed for each item in Chapter 6 and presented there, with a summary extraction into Chapter 7.	A4-4.1;4.2;4.3;5.1 to 5.4	
7.1 Adequacy of Water Quality Criteria		
7.2 Recommended Water Quality Criteria		
7.3 Recommended Abatement Requirements to Meet Criteria		

Revised 9/8/74

RECOMMENDATIONS

The implementation of the following Recommendations by the Upper Lakes Reference Group will assist the Committee for Data Quality in determining the accuracy of, and the confidence which can be placed on data which is to be incorporated into the Final Report. These Recommendations represent goals which are not necessarily achievable at the present time.

1. DEFINITIONS

The following working definitions are recommended:

A. Total - the entire amount of a parameter or species present in a sample, subject to other modifiers given. Example: TKN includes all forms of Kjeldahl nitrogen present but does not refer to filtration.

B. Filtered - referring to a procedure whereby suspended and other solid materials have been physically removed from the sample.

C. Dissolved - referring to a parameter or species in a sample which has been filtered; synonymous with "soluble."

D. Digested - referring to the chemical treatment of a sample to obtain a total constituent, usually involving addition of acid and fuming.

2. NOMENCLATURE

The following nomenclature and units are recommended for analysis of samples and reporting of data. Whether or not the sample has been filtered must be specified.

A. Phosphorus - report all parameters as mg P/l.

Total phosphorus (unfiltered sample)
Unfiltered inorganic phosphorus
Unfiltered reactive phosphates
Total dissolved phosphorus
Dissolved inorganic phosphorus
Dissolved reactive phosphates

B. Nitrogen - report all parameters as mg N/l.

Unfiltered TKN
Unfiltered ammonia
Unfiltered nitrate
Unfiltered nitrate plus nitrite

Dissolved TKN

Dissolved ammonia

Dissolved nitrate

Dissolved nitrate plus nitrite

C. Chloride - report as mg Cl/1.

Unfiltered chloride

Dissolved chloride

D. Silicate (NOT SILICA) - report as mg SiO_2/1.

Unfiltered reactive silicate

Dissolved reactive silicate

E. Sulphate - report as mg SO_4/1.

Unfiltered sulphate

Dissolved sulphate

3. CALCULATED DATA

All concentrations reported should be marked if they are calculated rather than directly measured.

4. PRECISION

It is recommended that the within-lab, between-run standard deviation be reported to the data user in a uniform way with all analytical data. The highest priority for implementing and reporting this standard deviation should be given to the five materials balance parameters. The procedure for this measurement is being developed.

5. SAMPLE COLLECTION EQUIPMENT AND PROCEDURES

Sample collection equipment and procedures are critical for all forms of N and P. It is recommended that the IJC undertake comparative studies to evaluate the effect of different procedures and equipment on the bias and the precision of the analytical results.

6. FILTRATION

The CDQ urges that all samples collected for subsequent analysis for all dissolved and particulate N and P parameters be filtered at the time of collection. If filtration is not done at the time of sample collection, resulting data for N and P parameters will not be comparable. Either a glass fibre or a membrane filter should be used. Although these two types

of filters may produce differences in analytical results, data to substantiate differences are not available. Although a longer filtration time is required, a 0.45 µm membrane filter is preferable as its characteristics and behaviour are more rigorously defined than for the glass fibre filter. Decantation, especially for unfiltered reactive phosphates, should not be employed as this results in a sample consisting of dissolved and an undefined and probably non-reproducible fraction of suspended and solid material. Data from such samples are not directly comparable with data from filtered samples.

7. NITROGEN

Total Kjeldahl Nitrogen (TKN) is measured on both filtered and unfiltered samples. Significant differences exist between values for filtered and unfiltered TKN. Non-standard digestion techniques and procedures to measure the ammonia subsequently formed exist. The accuracy, precision, and the comparability of data for TKN will not improve until studies are initiated and completed to standardize the methodology. Results at best can be reported to only about the nearest 0.05 mg N/l. It is recommended that all TKN data be treated with suspicion at all concentration levels, and especially for open lakes waters.

Ammonia is measured on both filtered and unfiltered samples. The differences between filtered and unfiltered ammonia values are not known. The concentration reported is influenced by the preservation and handling procedures, the time between collection and analysis (shelf life), and the filtration method, for concentrations less than 0.1 mg N/l. While values greater than about 1 mg N/l are generally satisfactory, it is recommended that concentrations less than about 0.05 mg N/l be treated with suspicion, as there could exist a significant percentage bias. On-site analysis is preferable for ammonia concentrations less than 0.1 mg N/l although very rarely practical.

Nitrate methodology and data are probably satisfactory at the concentrations present (greater than about 0.1 mg N/l) in the Upper Lakes. Results should be reported to the nearest 0.005 mg N/l. Filtered and unfiltered nitrate data are not significantly different.

Nitrite is not required and need not be performed separately. Nitrate plus nitrite should be analyzed for and reported to the nearest 0.01 mg N/l.

8. PHOSPHORUS

All phosphorus data should be reported to the nearest 0.001 mg P/1.

Total Phosphorus is measured on an unfiltered sample subjected to a persulphate digestion. The sample can be most easily preserved for this parameter. It is recommended that the currently employed colorimetric method be used.

Unfiltered Inorganic Phosphorus is the sum of reactive and hydrolyzable phosphate, measured on a sample subjected to a sulphuric acid digestion (no persulphate) and subsequent colorimetric analysis. It is recommended that the currently employed analytical method be used.

Unfiltered Reactive Phosphates are measured by direct colorimetry without sample digestion. It is recommended that all data be treated with suspicion because the concentration reported reflects sample collection and handling, the time between collection and analysis (shelf life), the analytical method employed, and the type of water and/or sediment. The analysis should only be performed on samples with an insignificant amount of suspended material.

The same methodology is followed and conclusions reached for the three corresponding dissolved phosphorus forms. The difference is that the sample is filtered. The data reported as dissolved reactive phosphates is not ambiguous if the sample is filtered and analyzed at the time of collection.

9. CHLORIDE

Filtration and preservatives are unnecessary. Although standardization of sampling techniques would be desirable, those presently in use are satisfactory. Colorimetric analytical methods appear more sensitive than titrimetric or potentiometric methods, although there appears to be no real difference in their potential for accuracy. Because of the chloride concentrations in Upper Lakes waters ($<$ 10 mg Cl/1) it is recommended that the automated mercuric thiocyanate colorimetric method be used; at higher concentrations other methods, e.g. titrimetry and the selective ion electrode may be suitable. Chloride should be reported to the nearest 0.1 mg Cl/1 at less than 10 mg Cl/1 and to the nearest 0.5 mg Cl/1 at greater than 20 mg Cl/1.

10. SULPHATE

Filtration is unnecessary. Only the methyl thymol colorimetric method, which can be routinely automated, possesses sufficient sensitivity to measure sulphate concentrations in the Upper Lakes waters ($<$ 10 mg SO_4/1), although other methods

demonstrate satisfactory accuracy and precision within higher concentration ranges. Sulphate should be reported to the nearest 0.1 mg SO_4/l at less than 10 mg SO_4/l and at least to the nearest 0.5 mg SO_4/l at greater than 20 mg SO_4/l.

11. REACTIVE SILICATE (NOT SILICA)

It is recommended that the currently employed colorimetric method, which does not measure silica in the sediment, be employed. Filtration should be performed although there is essentially no difference in results from an unfiltered sample. Results should be reported to two significant figures.

12. INTERLABORATORY COMPARISONS

It is recommended that interlaboratory comparisons be routinely continued for N, P, Cl, SO_4, and silicate in order to ensure continued accuracy, precision, and comparability and to eliminate laboratory bias, utilizing satisfactorily chosen samples.

13. PAST DATA

For all data collected to date for N, P, Cl, SO_4, and silicate, which is to be employed in the preparation of the Final Report, each jurisdiction is requested to verify with its laboratory, and preferably with the analyst, which produced the data that the sample collection and handling procedures and the analytical methods are identical to that currently employed for which intercomparison results have been reported to the CDQ, and that the accuracy and the precision are the same as that currently being reported. If there has been any change in the total system, the jurisdiction is requested to detail the change and to document its effect on accuracy (between-lab bias) and precision.

The personnel, funds, and time required for conducting this task should be provided by the jurisdictions.

The evaluation of past data will be based upon the points given in a questionnaire similar to the attached draft.

QUESTIONNAIRE

FOR THE EVALUATION OF PAST DATA FOR THE FINAL REPORT OF THE UPPER LAKES REFERENCE GROUP

Parameter _____ Laboratory _____

Other Nomenclature _____ _____

Time Period and Survey	PRESENT PROCEDURE	FIRST PREVIOUS PROCEDURE	SECOND PREVIOUS PROCEDURE
Sampling and Analytical Method and Reference			
Differences from newer method adopted			
Upper limit of analytical working range, mg/l			
Resolution (smallest concentration difference which can be practically detected) within working range, mg/l			
Reported detection limit, mg/l			
Estimated within-run standard deviation at or near detection limit, mg/l			
Estimated within-run standard deviation at mid working range, mg/l			
Estimated between-run standard deviation at mid working range, mg/l			
Bias - difference between past and present data introduced with any and all changes in sampling and analysis methodology, mg/l			
Acceptability of Data for Final Report - Comments			

Attachment No. 3

COMPLETED DRAFT REPORTS FOR STUDY ITEM I FROM WORK GROUP A

Description of Upper Lakes Basin:

Project Number	Title
2.1.1	Geology, Hydrogeology, Topography, Physiography
2.1.3.1	Physical & Chemical Limnology
2.1.3.2	Biological Limnology
2.1.3.3 (Canada)	Water Resources. Fisheries
2.1.3.4	Water Resources. Hydrology
2.2.1	Demographic and Settlement Patterns
2.2.2.1	Economic Activities and Conditions (except fishing and recreation)
2.2.2.2	Commercial Fishing
2.2.3	Land Uses
2.2.4	Recreation
2.2.5	Institutional
Factors Affecting Environment	
3.1.1	Geology, Hydrogeology, Topography, Physiography
3.1.3.1	Water Resources. Variation in Lake Levels, Flooding, and Runoff
3.2.1	Population Densities and Rates of Urbanization
3.2.2.1 (U.S.)	Water Resources. Industrial Activities (except fishing and recreation)
3.2.2.3	Fish Introductions
3.2.5	Recreation

Attachment No. 4.

CANADA CENTRE FOR INLAND WATERS — PROJECT FORECAST

CENTRE CANADIEN DES EAUX INTERIEURES — 19 74/75

1. KEY WORDS		PROJECT NO:74/IW-LR-077
2. FILING DATE:	PROJECT YEAR:	DURATION:

3. PROGRAMME:

4. PROJECT NAME: Toxic Organic Survey of Lake Huron/Georgian Bay and Lake Superior

5. DIVISION, UNIT, GROUP

PROJECT TEAM
M. Fox
W. Glooschenko

NOTES
Related to
IJC ULR

6. OBJECTIVE: To provide a baseline study of selected toxic organic substances in the Upper Lakes.

RELEVANCE: To provide information on toxic substances distribution in Upper Lakes for Upper Lakes Reference Group.

WORK OUTLINE AND DESCRIPTION:

Emphasis will be placed upon toxic organic levels in both sediments and seston as integrators of these substances. During August 1974, a cruise will be made on the Upper Lakes with 9 stations on Lake Huron, 5 on Georgian Bay, 1 in North Channel, and 10 in Lake Superior. On each station duplicate sediment and seston samples will be collected and preserved for analysis at CCIW by WQD. Substances to be analyzed included selected organochlorine pesticides, PCB's, organophosphorous compounds, and phenols. Sediment samples will be analyzed for important parameters, influencing pesticide content including texture, organic matter content, Eh-pH, and mineralogy. Seston will be examined microscopically for estimation of various components. Surveys July and August, 1974.

Final data should be available for ULRG purposes by early 1975.

EFFORT REQUIRED: W. Glooschenko - 60% of time; M. Fox - 10%. The project will be tied into Task D, Activity 2 - Survey of river sediments and associated water quality of Dr. R.L. Thomas - LRD. Additional geological support will be needed for sediment studies.

7. MAN-YEAR EFFORT (excluding support) THIS FORECAST PERIOD	PROF:	TECH:	CAS:

8. PROJECT LEADER: W. GLOOSCHENKO — TEL: 637-4225

FORM 1

PROJECT D35 - LAKE HURON DISCHARGE Attachment No. 5.

Objectives

To assess the quality of Lake Huron water at its St. Clair River outlet and to provide a quantitative estimate of contaminant loadings at the outlet for use in materials balance calculations.

Plan Summary

As part of a continuing MOE - US EPA surveillance program on the St. Clair River, water quality monitoring will be undertaken at 5 points on a transect from Fort Gratiot light to Point Edward light. Both agencies have been maintaining annual surveillance of the Lake Huron output since 1966.

MOE will carry out 12 surveys from April to November 1974. On 8 of the surveys, each sampling point will be occupied 6 times over a 2 day period and on 4 surveys, each point will be sampled once on each of 3 consecutive days, yielding a total of 60 measurements at each location for the year. The parameters being measured are total and fecal coliform, fecal streptococcus, standard plate count, conductivity, pH, alkalinity, turbidity, dissolved oxygen, chlorides, dissolved silica, total and soluble phosphorus, total kjeldahl nitrogen, ammonia, nitrate, nitrite, phenols, chlorophyll a .

EPA is planning 6 to 7 surveys of the St. Clair River in the period from May to December 1974. Single coverage of the same locations monitored by MOE and for the same parameters will be provided on each survey.

Project Period

Field operation in 1974 will extend from April to December. The program is expected to continue in 1975 and beyond.

Report Expected

Report on 1973 and 1974 findings with comparison to earlier years, will be available March 1975.

Agencies Involved

MOE and US EPA

Senior Investigators

MOE - O. H. Moore (416) 965-6957
US EPA - C. Elly (312) 353-1458

Project Costs

Funded in existing surveillance programs on the lower lakes.

Data Storage

Toronto and Grosse Ile, Michigan